Research article

CONSTRAINTS ON THE USE AND ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TOOLS AND FARM MACHINERY BY PADDY FARMERS IN NEPAL

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ABSTRACT

Information and communication technology (ICT) tools such as radio, television, mobile phone, the internet and computers are gaining momentum in Nepal's agriculture development discourse, filling void that traditional agriculture extension has failed to fill. Agricultural mechanization implies using various power sources and improved farm tools and equipment in agriculture. This study aims to determine the barriers while using ICT tools and agricultutal machinery in Jhapa, Kapilbastu and Kailali districts of Nepal. Pretested semi-structured interview schedule was employed to collect data from 390 sample respondents selected randomly. Descriptive statistics and the appropriately developed scales were used in the data analysis. Moreover, respondents considered lack of awareness along with its requirement of skilled human resources and its cost were the primary reasons for the rejection of the use of ICT tools, where the overall rejection level was at a medium level. The constraints level of the use and adoption of farm machinery was found high; the significant constraints considered by the respondents were the high price of the machinery along with poor skills, knowledge, facilities, and poor maintenance service. The overall index value for the rejection of the use and adoption of farm machinery in paddy farming was at a moderate level. The respondents' primary reasons for the rejection of the use of farm machinery were the high price of the farm machinery long with poor training, poor skilled human resources, and complex ideas to learn. Hence, to overcome to those factors, appropriate awareness campaigns and educational programs are necessary.

Keywords: Constraints, ICT tools, farm machinery, paddy farming, adoption

INTRODUCTION

The use of Information and Communication Technology (ICT) in a variety of industries increased labor efficiency and production. Agriculture, like other economically important sectors, is now seeing widespread use of ICT in all aspects. According to Daum (2020), it has become one of the most important tools used by farmers to manage different information connected to input parameters such as water, labor etc.

ICT applications in agriculture are becoming more widespread throughout the world, which is assisting in the transformation of the industry's business and quality. The use of ICT in agricultural activities is growing in popularity across the world, and it is revolutionizing the sector's operations.

Mechanization is an important part of rice production that may be implemented at any stage (Ayandiji & Olofinsao, 2015). The key constraints for greater rice production include poor automation, small and fragmented land ownership, labor shortages, and young labor migration. Paddy farmers only utilize farm machinery sparingly during harvesting and threshing, but there is little or no usage of farm machinery during the rest of the production process. Farmers aren't always aware of the many types of machinery that might be employed at different phases of rice cultivation. Threshers, rotavators, cultivators, combination harvesters, transplanters, and other new machinery are useful in rice production and can be utilized. However, agricultural automation is limited due to a lack of mechanization infrastructure, as well as a lack of awareness and training. Most farmers lack the necessary expertise to operate farm machinery, and most farmers cannot afford or hire those tools due to their high cost.

The distribution of knowledge, ideas, innovations, and technology connected to farms and agriculture to farmers and rural people is the core role of the extension service. The International Food Policy Research Institute (IFPRI) extols the importance of agricultural extension in boosting productivity, ensuring food security, and promoting agriculture as a pro-poor economic growth engine (IFPRI, 2020).

The agricultural extension system in Nepal is beset by issues such as a lack of ICTs, a lack of finances, poor transportation, a lack of training, and interactions. As a result, the spread of agrarian knowledge would be reduced. Yaseen et al. (Yaseen et al., 2015). Physical distance and logistics are the main barriers between farmers and extension field employees. In this environment, it appears that enhancing extension services

through the appropriate use of electronic media is a must. In an urgent and emergency situation, electronic communication (radio, television) may play a critical role in transmitting valuable information to farmers. Farmers and rural residents receive timely information on various farm activities. A research in Kenya, for example, found that an ICT-based market information systems (MIS) initiative had a good and substantial impact on seed, fertilizer, labor productivity, and land productivity (Ogutua, 2014).

Cell phones, television, radio, the internet, and landline phones are the most common ICT technologies used in agriculture (Subashini & Fernando, 2017). Although farmers can instantly access all agricultural-related information and expertise, mobile phones are frequently utilized for communication, marketing, and contacting subject-matter professionals for information on a real-time basis (Syiem & Raj, 2015). Many research (Chikaire et al., 2017; Nzonzo & Mogambi, 2016) show that SHFs lack the necessary ICT literacy to integrate ICT into their agricultural methods. As a result, low ICT literacy and farmer poverty are potential roadblocks to ICT adoption in agriculture. There is currently a void in the research about SHF's ICT literacy competence and acquisition. As a result, establishing the ICT literacy levels of SHFs was deemed vital in order to build an innovative intervention directed at their growth in the future.

The fast development of modern information and communication technologies (ICT) has significantly altered the abilities required to communicate and operate successfully in modern agriculture.

Advanced computer technology, as well as the widespread use of cellphones and internet apps in agricultural activities, have radically altered how individuals find, analyze, and evaluate data. The huge volume of information that is now electronically available has also given rise to new affordances of information usage, allowing individuals to successfully live in and cope with the demands of a technological society. Terms like digital competences have been used to describe these new talents.

It is critical to use automation in Nepal to solve important issues such as rising cultivation costs, labor shortages, poor marketing, and traditional rice producing techniques (Shrestha, 2012). Furthermore, this has a good impact on the country's farmers' socioeconomic situations. As a result, mechanization is necessary and important for increasing farm size (Vanden et al., 2007). Despite the fact that small farms are more common, the usage of tractors is on the rise (Takeshima & Liu, 2018).

The provision of policies to promote a better environment for farm mechanization is also included in Nepal's New Constitution (2015). Agriculture Development Strategy (2015) mentions a number of initiatives for promoting farm mechanization, including increased awareness, capacity building, taxes, and funding. Agricultural mechanization has a number of advantages, but it also has certain drawbacks. Agricultural automation, according to Zhou and Lu (2012), may have negative environmental consequences. Soil compaction has negative consequences, and feces degradation leads to reduced yields (Pryor et al., 2017).

Though there is an increase in interest and curiosity about farm machinery, as well as use and adoption to some extent, it is not gaining traction due to the decreasing trend in small landholdings, expensive machines, a lack of maintenance and service centers, and the lack of appropriate implements and machinery for fragmented smallholdings. Furthermore, financial management, such as obtaining bank loans, making installment payments, and receiving grants, is not adequately handled, which might have a detrimental impact on mechanization. Nonetheless, the quality and dependability of the implements or farm machinery are not up to par for all brands or companies, and they have failed to earn the farmers' trust, forcing many to revert to old ways. The usage and acceptance of farm machinery and implements are too reliant on rural infrastructure and services. According to Singh (2008), efficient agricultural mechanization can save seeds 15-20 percent, fertilizers up to 20-30 percent, workers 5-20 percent, and increase cropping intensity by 10-15 percent and production by 15-20 percent. According to Verma (2008), the rise in cropping intensity for tractor-owning, tractor-hire, and bullock-operated farms was 165, 156, and 149 percent, respectively.

This study aims at finding out the major constraints on the use and adoption of various information and Communication Technology (ICT) tools and farm machinery used in paddy farming in Nepal.

MATERIALS AND METHODS

The study was conducted using a survey research approach. Because paddy is Nepal's most important cereal crop, three districts, namely Jhapa, Kapilbastu, and Bardiya, were purposefully chosen as the research site defined by PMAMP as a superzone for paddy. From District to group-level a multistage sampling approach was used for the study. A total of 390 households, 130 from each district, were sampled randomly. The methodologies used for primary data were household survey and Focus Group Discussion (FGD) while the instruments used were semi-structured pre-tested Interview Schedules and Checklist respectively. The mixed members ranging from 10-12 were selected with vigorous discussion with the major stakeholders for focused group discussion. A total of six Focused Group Discussions (FGDs), two from each district were conducted before and after the household survey to verify data and get ideas about the study area. Secondary data was gathered from published articles, journals, and other publications. The acquired data were analyzed using descriptive statistics and suitable scaling techniques once they had been cleaned and managed properly. Knowledge of ICT tools was assessed using a yes/no scale for the various types of ICT tools and agricultural machinery used in paddy farming. Simultaneously, a five-point rating system for both perception and attitudes on the numerous assertions questioned was devised. The respondents' perceptions and satisfaction with ICT tools and agricultural machinery used in paddy farming were then ranked using index values.

RESULTS AND DISCUSSION

Demographic characteristics of respondents in the study area

The respondents' demographic features revealed that the average age was 47.62 years, with a standard deviation of 11.79 years and a range of 20 to 82 years. The majority of respondents (54.6%) were between the ages of 18 and 48 years, while 45.4 percent were older than 48 years. (Table 1). Age, according to several studies, is a significant characteristic that plays an important role and is positively connected with knowledge transmission, innovation uptake, and technology transfer. Accordingly, older farmers are more reluctant to change than younger farmers, and they take longer to accept and adapt to new ideas, resulting in a lower adoption rate (Crusan et al., 1982; Habib et al., 2007).

Out of the total respondents, male respondents were 66.7 percent of the total, while female respondents were 33.3 percent. According to the findings, 14.6 percent of the respondents were illiterate, while 28.2 percent could only read and write. Whereas, 24.1 percent of the respondents had a secondary school education, 15.9 percent had a secondary school education, and 10% of the respondents had an intermediate level of education (Table 1). Overall, the literacy rate was high. People who are educated have more positive attitudes regarding agricultural skills, knowledge, and information than those who are ignorant (Hassan, 1991 and Habib et al., 2007). The average landholdings of the respondents were 0.93 hectares, with a standard deviation of 0.76 hectares and a range of 0.1 to 5 hectares. The majority of respondents (82.1%) own 0.17ha to 1.69ha of land, followed by those who own more than 1.69ha of land (11%), and those who own less than 0.17ha of land (6.9%). (Table 1). Greater landholdings imply more opportunities to boost production and efficiency by implementing contemporary technology. The amount of land holdings has a significant impact on the dissemination and adoption of new agricultural methods among farmers. Agriculture and livestock were likewise identified as the principal occupations in the study region, with 41 percent and 44.9 percent of respondents, respectively.

Table 1. Distribution of the respondents by various social characteristics

Characteristics		Frequency	Percentage
Gender	Male	260	66.7
	Female	130	33.3
Age (Years)	Min:20, Max: 82	Avg: 47.62	Std: 11.793
	Young (below 48yrs)	213	54.6
	Adult	177	45.4
Educational level	Illiterate	57	14.6
	Only read and write	110	28.2
	Less than SLC	62	15.9
	SLC level	94	24.1
	Intermediate level	39	10.0
	Bachelors and above	28	7.2
Occupation	Agriculture	160	41.0
	Agriculture and Livestock	175	44.9
	Skilled Occupation	9	2.3
	Government service	18	4.6
	Business	21	5.4
	Wage labor	6	1.5
	Private service	1	0.3
Total land area (ha)	Min: 0.1, Max: 5	Avg: 0.93	Std: 0.76
	Low (less than 0.17ha)	27	6.9
	Medium (0.17-1.69)	320	82.1
	High (more than 1.69)	43	11

Source: Field Survey, 2020

Attitude and perception of the paddy growers on ICT tools

Study findings revealed that the total attitude index score was 0.45, with a scale of 0 to 1. Twenty statements about ICT tools were selected to measure the attitude of respondents towards their preference of using ICT tools, and respondents' replies were recorded on a five-point scale based on their agreement with the assertions. Later, the index value of those replies was determined, and the statements were ranked according to the index value. Though respondents' overall attitude toward ICT tools appeared optimistic, it was low in comparison, and out of those statements, respondents strongly agreed that the content of the technologies should consider the language issue, and that ICT only partially solves the problem of poor extension of information to farmers' doorsteps when it was beneficial for distant farmers at inopportune times. Paddy farmers considered that ICT tools were heavily reliant on electricity and external sources, which may restrict their appeal, and they, too, believe that there is insufficient feedback (See Table 2).

Table 2. Attitude of the respondents toward ICT tools

Statements	Response categories					Index value	Rank
	SA	A	UD	DA	SDA		
ICTs are the best possible bridges between research systems and farming systems	31	259	49	44	7	0.34	XVIII
ICTs help in reducing the training and demonstrations cost.	53	286	43	8	0	0.49	VIII
ICTs reduce face to face contact between extension personnel and farmers	89	229	54	18	0	0.50	VII
ICTs demand more time and creativity	82	239	62	7	0	0.51	VI
ICTs involve more costs for installation and maintenance	100	171	63	55	1	0.40	XV
Feedback is fast through ICTs than traditional methods	40	189	87	74	0	0.25	XIX
ICTs use creates problems for that extension personnel who lack knowledge and inexperience with online technologies.	80	259	39	11	1	0.52	III
ICTs may replace the traditional extension methods in agriculture in the near future	58	220	70	42	0	0.38	XVII
ICTs enable interaction with more personnel at the same time for dissemination of agricultural technologies.	32	255	100	3	0	0.41	XIV
ICTs tools help to upgrade extension personnel	53	253	73	11	0	0.45	XII
ICTs are potentially faster tools of TOT for remote and diversified areas.	104	221	45	20	0	0.52	III
Transferring relevant information through ICT is not an easy task	80	232	67	8	3	0.48	IX
ICTs based extension services are a better alternative to present and future agricultural extension systems.	54	223	88	21	4	0.39	XVI
Existing ICTs infrastructure is not enough to meet the needs	86	229	55	14	6	0.48	IX
ICTs alone cannot solve all the problems related to agriculture information	106	221	47	16	0	0.53	II
ICTs help to established quality society	84	247	48	9	2	0.52	III
While using ICTs, it is necessary to develop material in the local language	172	192	25	1	0	0.69	I
Excess use of ICTs can create health hazards to its users (like back pain, neck pain, eyesight problems, etc.)	97	183	98	12	0	0.47	XI
ICTs enable better integration of various information sources for technology dissemination	70	201	111	8	0	0.43	XIII
ICT's effectiveness is affected by an interrupted power supply and lack of funds.	42	211	52	65	20	0.24	XX
Average Index Value						**0.45**	

Source: Field Survey, 2020

Note: The index value ranges from 0 to 1; closer to 1 related higher knowledge and possession of ICT tools

Where SA= Strongly agree, A= Agree, DA= Disagree, SDA= Strongly disagree.

Raza et al. (2020) observed that farmers' perceptions and preferences for ICT tools as their information source are influenced by socioeconomic situations, with the primary factors being cost, ease of use, and timely availability of information. According to Adegbidi et al. (2012), the usage of information and lower

travel expenses were the main reasons for a favorable attitude toward ICT technologies. On these, they were found to be more satisfied. Farmers' happiness with ICT tools, particularly mobile phones, was shown to be influenced by farm-related use, availability to current information, and ease of connecting to stakeholders, according to Khan et al. (2019). The many elements identified in prior research, as described above, might explain the differences in findings in different locations.

According to the study, the index value for restrictions while using ICT tools was higher, at 0.68. The restrictions to using ICT tools were rated on a five-point scale ranging from severe to non-existent, with late weighting given to the index score. Respondents said that lack of training, skills, and their inability to utilize tools because of their complexity were the most important limits of ICT tools, compared to others such as power supply and skepticism of technology. The high cost of ICT tools leads to limited accessibility, whereas the infrastructure required to employ those technologies was the major stumbling block. Mobile phones offer a variety of benefits to rural residents, including easy engagement and communication.

In addition, mobile phones come in handy in times of urgency and disaster (Sife et al., 2010). According to Aker (2011), they have good access to agricultural technology and extension services. Mobile phone-enabled technologies were utilized to monitor and communicate information regarding crop disease outbreaks, according to Ndyetabula and Legg (2011). Innovative technologies such as Geographic Information Systems (GIS), telematics, and ICT combined with satellite-based navigation, according to Bochtis (2013), might lead to more sustainable and efficient agricultural production systems. According to Raza et al. (2020), among farmers, mobile phones were preferred above television and radio. According to Islam et al. (2017), there was very little usage of the internet, computers, email, and social media. According to Adegbidi et al. (2012), cell phones, radio, and television are the most common ICT instruments utilized by farmers. ICT improved agricultural service and information distribution, according to Prodhan & Afrad (2015), and played a vital role in agricultural growth. According to Patil et al. (2008), newly developed ICT-based internet and social media technologies played an important role in spreading information and functioning as a substantial and important source of information. According to Casaburi et al. (2014), ICT technologies played a role in increasing agricultural production and productivity, resulting in an 11.5 percent increase in yield.

Table 3. Distribution of the respondents by the constraints during use of ICT tools

Statements	Level of extent					Index value	Rank
	Severe	High	Moderate	Low	Not at all		
Lack of ICT skills and inability to use	168(43.1)	137(35.1)	76(19.5)	3(0.8)	6(1.5)	0.79	II
No perceived economic benefits	101(25.9)	151(38.7)	107(27.4)	15(3.8)	16(4.1)	0.70	VII
Too complex to use	136(34.9)	167(42.8)	64(16.4)	16(4.1)	7(1.8)	0.76	III
No ICT access and or infrastructure	126(32.3)	129(33.1)	80(20.5)	39(10)	16(4.1)	0.70	VII
High cost of ICTs	123(31.5)	144(36.9)	83(21.3)	31(7.9)	9(2.4)	0.72	VI
Reliability	80(20.5)	97(24.9)	161(41.3)	36(9.2)	16(4.1)	0.62	X
Language barriers/illiteracy	118(30.3)	159(40.8)	83(21.3)	20(5.1)	10(2.6)	0.73	V
Not suitable for practice	72(18.5)	93(23.8)	111(28.5)	69(17.7)	45(11.5)	0.55	XII
Distrust of technology	57(14.6)	111(28.5)	101(25.9)	77(19.7)	44(11.3)	0.54	XIII
Time limitations	92(23.6)	110(28.20	99(25.6)	64(16.4)	25(6.4)	0.62	X
Lack of training	179(45.9)	152(39)	35(9)	18(4.6)	6(1.5)	0.81	I
Traditional practices	111(28.5)	163(41.8)	51(13.1)	33(8.5)	32(8.2)	0.68	IX
Lack of awareness	166(42.6)	114(29.2)	56(14.4)	36(9.2)	18(4.6)	0.74	IV
No power supply (no energy)	124(31.8)	30(7.7)	62(15.9)	59(15.1)	115(29.5)	0.49	XIX
Average Index Value						**0.68**	

Source: Field Survey, 2020

Note: The index value ranges from 0 to 1; closer to 1 symbolizes a higher level of awareness

Through numerous statements directly connected to ICT tools, the study looked at the causes for poor acceptance and usage of ICT technologies. The majority of respondents showed a lack of understanding, a

lack of competent human resources, and its cost, which were computed after taking replies on a three-point scale, as reasons for rejecting the use of ICT technologies (See Table 4). The aggregate index value for the reasons, on the other hand, was 0.58, which is greater. Respondents, on the other hand, had no worries about the power supply, its output, or its effects. According to Raza et al. (2020), mobile phones, radio, and television are easier to use than other ICT instruments. According to Nzonzo & Mogambi (2016), the key reasons for good impressions of various ICT tools were the simple availability of information, easy access to information, and lower cost of collecting information. People were aware of and had a positive view and favorable attitude toward utilizing ICT tools, according to Bano (2020). According to Khan et al. (2019), farmers' positive attitudes about different ICT tools, particularly mobile phones, were mostly due to simple access to market information and financial transactions.

Table 4. Reasons for rejection on the use of ICT tools

Reasons	Agreement			Index value	Rank
	Agree	Indifference	Disagree		
Lack of awareness	379(97.18)	3(0.77)	8(2.05)	0.95	I
Expensiveness	325(83.33)	49(12.56)	16(4.10)	0.79	III
Needs skilled manpower	344(88.21)	28(7.18)	18(4.62)	0.84	II
It is complex	266(68.21)	56(14.36)	68(17.44)	0.51	VIII
Non satisfactory results	180(46.15)	104(26.67)	106(27.18)	0.19	X
Highly technical	270(69.23)	90(23.08)	30(7.69)	0.62	VI
More risk as being new	255(65.38)	87(22.31)	48(12.31)	0.53	VII
Not applicable for all	299(76.67)	53(13.59)	38(9.74)	0.67	V
Not proper maintenance	232(59.49)	107(27.44)	51(13.08)	0.46	IX
No training	312(80)	32(8.21)	46(11.79)	0.68	IV
No power supply	195(50)	42(10.77)	153(39.23)	0.11	XI
Average Index Value				**0.58**	

Source: Field Survey, 2020

Note: The index value ranges from 0 to 1; closer to 1 show an increase in skill xxx

Constraints faced by the farmers during use of farm machinery

In terms of the usage and adoption of agricultural machinery, the total index value of the degree of constraints was 0.70, which was greater (See table 5). After receiving replies on various levels of the degree of the limits on various activities connected to the use of agricultural machinery, the level of constraints was computed. Respondents thought that farm machinery being expensive and having low skills restricts the use of farm machinery in paddy farming, as well as insufficient understanding of farm machinery connected to rice farming, based on numerous activities and settings. Respondents did not believe that farm machinery was only suited for big farms or that there was a scarcity of fuel; rather, they saw a lack of maintenance facilities and illiteracy as major barriers to utilizing and adopting farm machinery in paddy farming. In India, the presence of farm machinery has a favorable impact on food grain yield (Ramana & Kumari, 2020). Modern harvesting equipment, on the other hand, were rarely used, and farmers were unfamiliar with how farm technology worked (Chandra Nath et al., 2017). The majority of the respondents had a basic understanding of agricultural mechanization procedures in rice production (Swamy et al., 2013). Farmers' age, education, farming experience, family size, landholding, yearly income, mass media exposure, extension contact, extension engagement, and economic motive all showed a strong relationship with their attitude toward farm mechanization, according to Sahana et al. (2018). Ayandiji & Olofinsao (2015) revealed that access to extension agents and machines were the only two factor variables that had a significant effect on the adoption of farm mechanization, and access to credit by farmers increased the adoption attitude to mechanization.

Table 5. Distribution of the respondents by the constraints during use of farm machinery

Reasons	Level of extent					Index value	Rank
	Severe	High	Moderate	Low	Not at all		
Lack of basic skills	159(40.8)	159(40.8)	43(11)	7(1.8)	22(5.6)	0.77	II
Lack of facilities to buy machinery	143(36.7)	161(41.3)	55(14.1)	2(0.5)	29(7.4)	0.75	IV
Lack of facilities to maintain machinery	120(30.8)	154(39.5)	73(18.7)	3(0.8)	40(10.3)	0.70	V
Low literacy	134(34.4)	108(27.7)	89(22.8)	20(5.1)	39(10)	0.68	VII
Erratic fuel supply	65(16.7)	117(30)	87(22.3)	67(17.2)	54(13.8)	0.55	XI
Poor infrastructure	132(33.8)	129(33.1)	82(21)	11(2.8)	36(9.2)	0.70	V
Farm machinery is expensive	232(59.5)	123(31.5)	34(8.7)	1(0.3)	0(0)	0.88	I
Lack of knowledge	155(39.7)	163(41.8)	34(8.7)	5(1.3)	33(8.5)	0.76	III
Lack of human resources	98(25.1)	168(43.1)	68(17.4)	18(4.6)	38(9.7)	0.67	VIII
No access to all the people	109(27.9)	156(40)	67(17.2)	13(3.3)	45(11.5)	0.67	VIII
Suits only for large farms	77(19.7)	170(43.6)	63(16.2)	22(5.6)	58(14.9)	0.62	X
Average Index value						**0.70**	

Source: Field Survey, 2020

Note: Figures in parentheses indicate the percentage

According to the findings of the survey, respondents' rejection of the use of agricultural machinery was 0.59. The grounds for rejection were presented, and the replies were recorded on a three-point scale, after which the index value was determined. Respondents cited cost as the top reason for rejection, as well as a lack of training, skills, and expertise, but they did not find agricultural machinery difficult or the outcomes poor. Farmers that have access to finance are more likely to adopt mechanization since they can afford to pay for their services and so boost their production continually, according to Ayandiji & Olofinsao (2015).

According to Kumar et al. (2017), most small farmers have negative attitudes about agricultural equipment and machines. Bite et al. (2015) performed a research on farmers' attitudes regarding agricultural mechanization in the Maharashtra district of Akola, and found that the majority of farmers were in favour of farm mechanization. Credit sources, information sources, risk preferences, scientific orientation, and extension contact were all shown to be positively and substantially associated to attitudes toward agricultural mechanization.

In Himachal Pradesh, Thakur and Sharma (2016) investigated farmers' attitudes regarding modern farm technology, tools, and implements. Although they had strong scientific orientation and economic incentive, the majority of them had a neutral attitude toward contemporary agricultural mechanization, i.e., they were neither positive nor disapproving. Farmers viewed agricultural mechanization favourably, according to Bautista et al., (2017), since it will lead to more efficient farming. Farm mechanization was seen by the majority of farmers as making farming simpler. Ani et al. (2018) investigated the factors that influence farmers' attitudes toward using agricultural machines and found that the larger the farm, the more training provided by the government extension office, and the longer the farming experience, the lower the negative attitudes toward the use of transplanters and combine harvesters. Despite possessing great economic and scientific orientations, the majority of respondents expressed an indifferent opinion toward contemporary farm automation. Extension personnel are responsible for changing a negative attitude toward farm mechanization into a positive one (Thakur & Sharma, 2016). The majority of farmers were in favor of mechanization, but more help was needed to encourage them to do so (Sahana et al., 2017). Farmers had a good perception of farm machinery and a positive attitude towards farm machinery (Wahyuningsih et al., 2021).

Table 6. Reasons for rejection of the use of farm machinery.

Reasons	Agreement			Index value	Rank
	Agree	Indifference	Disagree		
Knowledge is difficult to learn	305 (78.21)	37(9.49)	48(12.31)	0.66	IV
It is Expensive	381(97.69)	9(2.31)	0(0)	0.98	I
It needs skilled human resources	338(86.67)	28(7.18)	24(6.15)	0.81	III
It is complex	244(62.56)	65(16.67)	81(20.77)	0.42	IX
The results are not satisfactory	157(40.26)	67(17.18)	166(42.56)	-0.02	X
Highly technical	275(70.51)	78(20)	37(9.49)	0.61	V
More risk as being new	255(65.38)	85(21.79)	50(12.82)	0.53	VII
Not applicable for all	284(72.82)	61(15.64)	45(11.54)	0.61	V
Not proper maintenance	243(62.31)	100(25.64)	47(12.05)	0.50	VIII
No training	350(89.74)	21(5.38)	19(4.87)	0.85	II
Average Index value				**0.59**	

Source: Field Survey, 2020

Note: The index value ranges from -1 to +1; positive value resonates agreement

CONCLUSION

As a result, it can be inferred that the respondents have several challenges in terms of adopting and using ICT tools and farm gear in paddy farming. Furthermore, there was a high rate of rejection. The rejection of ICT tools and agricultural machinery was mostly due to a lack of awareness, training, and understanding. The use of ICT tools was hampered by poor access, high costs, and inadequate technology for all sorts of respondents, while the adoption and usage of agricultural machinery was hampered by poor appropriateness for all types of land and illiteracy, in addition to the prior issues. As a consequence, increased understanding, awareness campaigns, and training would increase the acceptance and usage of ICT tools and agricultural machines, perhaps lowering the rejection rate significantly.

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